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Diachronic generation of juvenile and crustal Archean leucogranites in southwestern São Francisco Craton, Brazil: major/trace elements, Nd-Sr isotopes and LA-ICPMS U-Pb data

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New whole-rock element and Nd-Sr isotope data are presented for Archean leucogranites of the Campos Gerais Complex (CGC), which belongs to the autochthonous Archean-Paleoproterozoic basement of the southwestern São Francisco Craton (SFC), southeast Brazil. Three of the samples were also dated by LA-ICPMS U-Pb zircon geochronology. The new results are integrated to previously published data in order to discuss potential geodynamic scenarios for leucogranite generation in this relic of Archean crust. The CGC is a granite-greenstone terrain where the granitoid rocks are represented by TTG suites associated to minor sanukitoid varieties; and hybrid to peraluminous high-K biotite (± muscovite) leucogranites. New U-Pb results are presented for one Mesoarchean and two Neoarchean leucogranite samples. Sample ALP-AC-37B yields upper intercept at 3178±0.5 Ma, coincident with a concordant grain at 3179±17 Ma, interpreted as crystallization age. Mantellic derivation is corroborated by the equivalent Tdm of 3.18 Ga and initial Epsilon Nd of +1.3. The two other dated samples yield Neoarchean ages: sample CMV-100 yields upper intercept at 2767±1 Ma, coincident with a concordant grain at 2777±19 Ma; and sample CMV-102 with upper intercept at 2812±1 Ma. Previously published granitoid data comprise two Mesoarchean samples generated at 3.18 Ga and one at > 2.91 Ga, and four Neoarchean ones ranging from 2.77 to 2.82 Ga. These younger leucogranites show derivation from older, probably TTG crust, indicated by chemical composition, Tdm ages between 3.13 and 3.57 Ga, and initial Epsilon Nd between -3.8 and -8.6. The whole dataset defines at least three pulses of high-K leucogranite generation in the CGC: a) ca. 3.18 Ga leucogranites with juvenile signatures; ca. 2.82 Ga crustal leucogranites following TTG-sanukitoid generation; and young juvenile leucogranites at ca. 2.78 Ga, synchronous with the emplacement of also juvenile TTG stocks. The dataset corroborates a complex tectonic scenario for leucogranite generation. Some leucogranites are crustal melting products of the amalgamation of magmatic arcs represen, by juvenile TTG and sanukitoid rocks. However, the occurrence of juvenile leucogranites, that are either synchronous or diachronous to TTG suites, suggests the operation of magmatic differentiation processes within the mantle, prior to emplacement in the proto-continental crust.